

Carolina Sky Watcher



National Weather Service, Newport, NC

Vol. 10, Number 3 (#37) December 2003-February 2004

WINTER WEATHER ISSUE

HEAVY SNOW IN EASTERN NORTH CAROLINA

With winter rapidly approaching, it is important to remember that Eastern North Carolina can experience a wide variety of severe winter weather. Winter storms are deceptive killers in that most deaths are indirectly related to the storm. Many deaths during winter storms are attributed to house fires, traffic accidents, marine accidents, heart attacks while shoveling snow and hypothermia. Statistically, heavy snowfall in Eastern North Carolina is a rare event. The probability of a heavy snowfall (8" +) in any given winter season in Eastern North Carolina is

between just 5% and 10%. That percentage drops dramatically over the Outer Banks to only 1%. The average seasonal



snowfall over Eastern North Carolina ranges

from 4-6" over Martin, Pitt and Greene counties to less than 2" over the Outer Banks.

The past few winters in Eastern North Carolina have been unusually active. Three major winter storms have occurred in the past 3 years, with each storm depositing 8" or more of snow. The winter storm that occurred on December 2-4, 2000 dumped 8-12" of snow over parts of Martin, Pitt and Greene counties. These counties received twice their annual average snowfall in just 2 days. Just over a year later, on January 2-3, 2002, parts of Lenoir, Duplin, Greene, Pitt and Martin counties received up to 9" of snow.

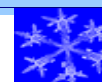
On January 23, 2003, portions of the Outer Banks were blanketed with up to 12" of snow courtesy of a strong area of low pressure off the North Carolina coast. Mainland Dare, Mainland Hyde and downeast Carteret county all reported over 8" of snow. Reports of snow drifts up to 3-4 feet were received

(Continued on 2)

In this Issue...

Heavy Snow in Eastern NC (continued)	2
Participation in Winter Weather Experiment	2
2003 Atlantic Hurricane Season in Review	3
Blowout Tides	4
SKYWARN Recognition Day	5
2003 Precipitation	6
Flooding over the Southern Pamlico Sound	7

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(Continued from 1)

from numerous locations along the Outer Banks. The foot of snow the storm deposited was the most snow that had fallen on the Outer Banks since the December 1989 storm that dumped an all-time record of 13.3" at Cape Hatteras. Besides depositing once-in-a-decade snowfall along the Outer Banks, this storm was also unusual in that all 100 counties in North Carolina received measurable snowfall.

While the statistics indicate heavy snowfall in Eastern North Carolina is relatively rare, the past few winters should serve as a reminder to residents that it can still occur in any given winter. The National Weather Service in Newport/Morehead City, NC provides timely and accurate warnings, watches and forecasts for 15 counties in Eastern North Carolina that can be accessed via the internet at: <http://www.erh.noaa.gov/mhx/>

New this year is the National Digital Forecast Database (NDFD). The NDFD provides a graphical representation of many forecast parameters at 3-hour intervals out to 3 days and at 6-hour intervals out to 7 days. Users can graphically view many useful forecast parameters including temperature, wind speed and direction, amount of precipitation and expected snow accumulation. The NDFD can be accessed via the internet at the following address: <http://www.erh.noaa.gov/mhx/gfe/gridded.html>.



By Brandon Vincent

Participation in Winter Weather Experiment Aids MHX Forecasters

Over the winter, the forecasters at the weather forecast office (WFO) in Newport will participate in the National Weather Service (NWS) Winter Weather Experiment (WWE) along with many NWS offices in the United States. The goal of the WWE is to improve winter weather services to the public. This is accomplished through enhanced collaboration among NWS operational offices, using centrally produced guidance products tailored to assist the watch/warning decision making process at WFO's. The graphics include event total accumulations of snow and sleet and also for freezing rain; winter storm watch/warning potential; and synoptic charts. These charts make it easier for WFO forecasters to see what the "expert" forecasters at the National Center for Environmental Prediction are thinking as to how the numerical models are handling a potential winter storm system. An additional feature is a telephone conference call among affected offices that further assists with coordination. WWE started during the 2001-2002 winter season and covered just the New England states. In 2002-2003 the experiment expanded to the eastern and central U.S. and Newport was invited to participate. This winter, WWE will include part of the western U.S. A good example of how WWE has aided the forecast process at Newport is the storm of January 23 2003 that dumped 8 to 12 inches of snow along the North Carolina coast. Although the models handled this storm well and were fairly consistent starting 2 to 3 days before the event, the WWE process added value to the forecast. It helped to fine tune snow amount predictions and the forecast track of the surface low pressure system. This increased forecaster confidence in the models, thus leading to better forecasts, products and service to the public. The Newport forecasters are looking forward to participating again this winter in our efforts to provide the best possible service for eastern North Carolina.

By Jim Merrell



NWS Newport, NC Participated in the 2003 SKYWARN Recognition Day



The Newport National Weather Service Forecast Office participated in the fifth annual SKYWARN Recognition Day (SRD), which took place this year on Saturday, December 6, 2003. SKYWARN Recognition Day was developed in 1999 by the National Weather Service and the American Radio Relay League. The purpose of the event is to recognize Amateur Radio operators for the vital public service they perform during times of severe weather, and to strengthen the bond between radio amateurs and their local National Weather Service office. During the day SKYWARN operators visit NWS offices and contact other radio operators across the world.

Traditionally, hams have assisted the National Weather Service during times of severe weather by providing real-time reports of severe events and storm evolution. "You simply can't put a price tag on it", says Scott Mentzer (N0QE), organizer of the event and Meteorologist-In-Charge at the NWS office in Goodland, Kansas. "The assistance that radio amateurs have provided to the NWS throughout the year is invaluable".

SKYWARN Recognition Day this year was held from 7 pm, December 5th to 7 pm, December 6th, 2003. The NWS Newport amateur radio station (WX4MHX) operated during much of this event and mostly on the 20 meter HF amateur radio band. Local hams were invited to participate and help operate the WX4MHX radio station during this event. In addition to the radio action and contacts, the NWS Newport had a

Scott Mentzer, the creator and promoter of the event, strives to involve more NWS offices and Amateur Radio operators each year. In 2002, participants logged nearly 23,000 contacts during the 24-hour event. Last year, nearly 70 countries were contacted. To learn more about this year's event, check out the NOAA Web site: <http://hamradio.noaa.gov>. This site includes a link to a list of participating National Weather



cookout in appreciation for the SKYWARN volunteers. The cookout portion was from 10 am to 3 pm, and featured hamburgers and hot dogs, beans, slaw and chips, and of course soft drinks and sweet tea.

Service offices and their call signs. You can also contact Nick Petro or John Cole at (252) 223-5122 for more information.

By Nick Petro

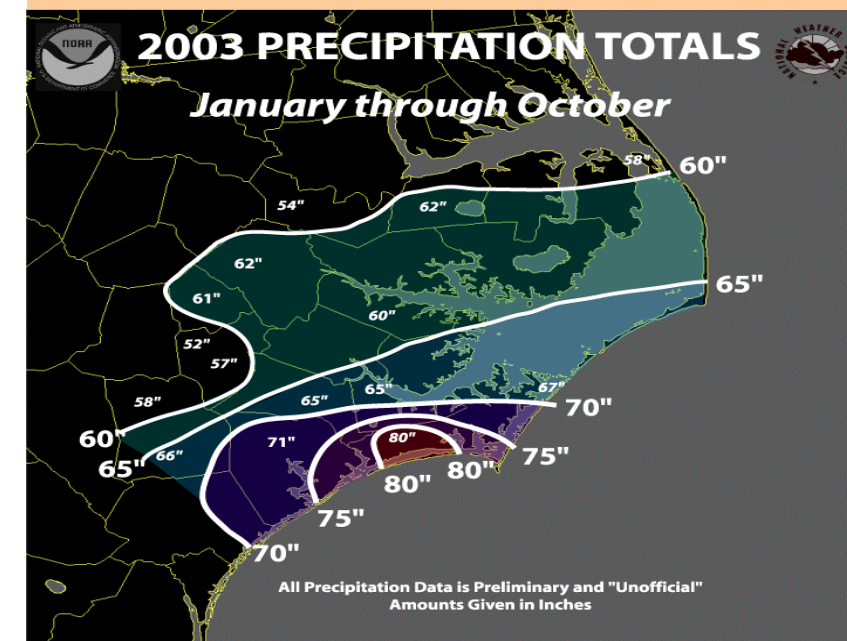


Figure 1: Preliminary Precipitation Totals for Eastern North Carolina.

Wet 2003 Continues

At the NWS office in Newport we have had record rainfall through October where we have measured 80.90 inches. This is the most rainfall recorded by this office since recording began in 1996. The previous record was 74.82 inches in 2000. Through October, Cape Hatteras has received 74.43 inches and this is the most rainfall since the record year of 1989 when they received 90.84 inches. New Bern has received 66.77 inches. All of eastern North Carolina has had above normal rainfall. The outlook for the period December through February is for near normal temperatures and precipitation.

NOR'EASTERS

A Nor'easter is a rapidly developing coastal low, which primarily affects coastal areas with strong winds, heavy rains, and ferocious seas. The coastal counties of North Carolina are particularly vulnerable to the impacts of Nor'easters, making it clear that fierce coastal storms can hit here any time of the year. One of the most infamous Nor'easters of all time known as the "Ash Wednesday Storm" reshaped the coastline from North Carolina to New England in March, 1962. This major storm caused over \$300,000 dollars in damage. At the storm's peak, hurricane force winds pounded the Outer Banks of North Carolina. Many inlets along the Outer Banks were made un-navigable by the storm. New inlets were eroded by the high waves and surge created by the fierce storm.

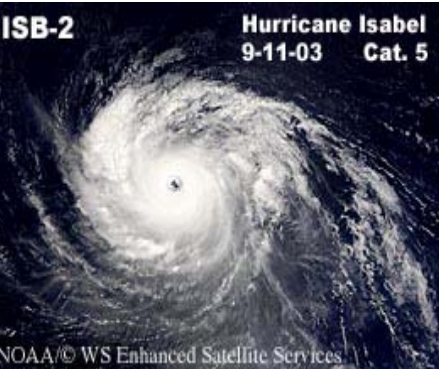
Why do Nor'easters occur here? The Gulf Stream off the east coast during the winter season acts to dramatically enhance surface horizontal temperature gradients within the coastal zone. During winter offshore cold periods, these horizontal temperature gradients can result in rapid and intense destabilization of the atmosphere directly above the Gulf Stream. This air mass transition period often leads to coastal storm development. As a low pressure deepens, winds and waves can quickly increase and cause serious damage to coastal areas.

By Sarah Jamison



2003 Atlantic Hurricane Season in Review

As predicted, the 2003 hurricane season was an active one. Fifteen named storms were recorded. Six of these tropical systems reached hurricane force with winds 74 mph or higher, and of these 3 were major hurricanes with winds greater than 110 mph. Hurricane Isabel developed in September reaching Category 5 strength, on the Saffir/Simpson scale, with sustained



winds of 160 mph. Isabel made a direct hit in eastern North Carolina on September 18th. Fortunately, Isabel weakened to a category 2 hurricane with sustained winds of 100 mph prior to landfall. Even so, Isabel wrought much damage across eastern North Carolina.

Isabel made landfall around noon on Core Banks and extreme eastern Carteret county and moved north northwest around 20 mph. Areas along and east of the center of the storm experienced significant wind and storm surge effects. Beach erosion and overwash were enhanced, especially across the Outer Banks, due to the fact that Isabel made landfall around the time of high tide, and the large 20 foot waves on top of the 6 to 8 foot

storm surge. Over 350 million dollars in damage occurred across Dare county alone. Other areas which experienced significant storm surge, causing the flooding and destruction of many homes, were downeast Carteret county, eastern Pamlico county, and southern Craven county, where areas were inundated with a 7 to 10 foot storm surge. A 4 to 6 foot storm surge, from Pamlico Sound, across southwestern Hyde county in Swan Quarter resulted in the flooding of hundreds of homes. The highest storm surge values occurred in the lower reaches of the Neuse and Pamlico Rivers with a storm surge of 10 feet. This storm surge was worse than Hurricane Dennis in 1999 and was compared to some of the hurricanes of the past including Hurricane Ione in 1955, and the hurricane of 1933. Wind gusts of 100 mph resulted in structural damage to homes and extensive tree damage across



no deaths or injuries directly related to the storm. In part, this is because residents across eastern North Carolina are storm savvy, and know what precautions to take to mitigate the effects of hurricanes. Also, the forecast from the National Hurricane Center for Isabel was remarkable, giving at least 3 days notice of impending hurricane conditions across eastern North Carolina.

At this time it's a little too early to tell what the 2004 hurricane season will bring. However, with only a mild El Nino expected in 2004, very likely the number of storms will be at least average. Remember, it only takes one hurricane strike to make a significant season. We must all be prepared each year, regardless of whether the yearly predictions are low or high, especially residing in one of the most hurricane prone areas of the United States.

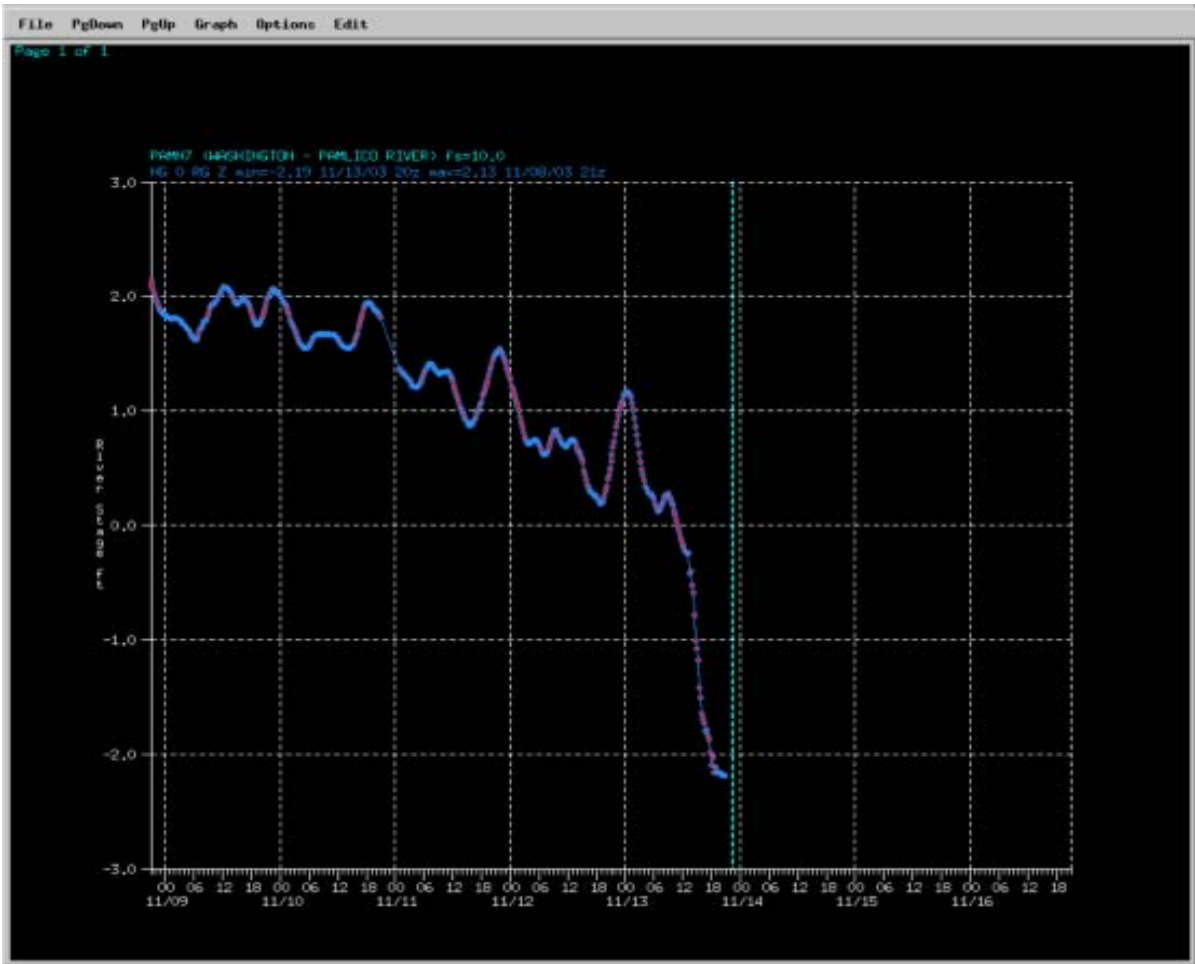
By John Cole



Storm Damage in NC

Hyde, Tyrell, and Washington counties with prolonged loss of electricity.

One thing we can all be thankful for is that, amazingly, there were



**WATER LEVEL TREND AT WASHINGTON, NC
NOVEMBER 9TH THROUGH THE 14TH.**

Blow out Tides

The above graph shows the water level trend on the Pamlico river at the United States Geological Survey (USGS) gage in Washington (PAMN7). Notice at the end of the graph, on November 13, how the water level suddenly drops about 3 feet. This is due to strong and persistent west winds of 20 to 30 mph with gusts to 40 mph. These west winds tend to push the water away from the west portion of the Pamlico sound and toward the Outer Banks. This is often referred to as "Blow out tides"...and can be a major navigational problem as boats can easily become beached or run aground in the very low water.

By Bob Frederick

Flooding Over the Southern Pamlico Sound

During Hurricanes and Nor'easters, areas along the southern portion of the Pamlico Sound often receive severe flooding. In fact, during Hurricane Isabel the largest storm surges of over 10 feet were reported between Clubfoot creek and Adams creek. This flooding is a direct result of wind direction, intensity and duration.

The Pamlico Sound is a very large and relatively shallow body of water. Daily tide changes are fairly small, normally less than 1 foot. Since the sound is so large, rainfall has little impact on water levels as well. Because the sound is shallow, winds can move or push the water from one end of the sound toward the other. For the areas adjacent to the southern portion of the Pamlico Sound, north to northeast will increase water levels. Areas like Cedar Island, South River, Harlowe, New Bern, Oriental and Bayboro are often flooded when strong north to northeast winds develop.

When water levels are expected to increase to 4 feet or more above normal, the National Weather Service will issue Coastal Flood watches and warnings, or Tropical Storm and Hurricane watches and warnings. Sustained winds of 35 to 40 knots for more than 12 hours, or 40 plus knots for a shorter duration will normally result in water levels rises of around 4 feet. The longer and harder the wind blows in the same direction, the more the water will rise.

During Isabel, north to northeast winds to gale force developed many hours before the Hurricane made landfall. Water levels were already several feet above normal as the Hurricane approached the coast.

When the winds increased to Hurricane force during landfall, water levels surged to 8 to 10 feet above normal in many locations, resulting in severe flooding.

When winds shift to the west to southwest, the water will rapidly recede. Sometimes the water will shift or "slosh" back toward the Outer Banks resulting in sound-side flooding on Ocracoke and Hatteras Islands. During Hurricane Emily, water levels over the sound side of Hatteras Island initially dropped as the hurricane approached the coast. When Emily turned to the north and the winds shifted to the west, very rapid water rises occurred over the eastern portion of the sound, producing a 8 to 10 foot surge between Buxton and Avon.

By Bob Frederick



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In This Issue...

Winter Weather

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Comments concerning this publication or questions about the National Weather Service can be directed to us. We invite submissions for inclusion in this publication

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You can monitor the latest weather conditions around the area, as well as our forecasts on:

NOAA Weather Radio

New Bern Transmitter KEC-84 162.400 MHz
 Hatteras Transmitter KIG-77 162.475 MHz
 Mamie Transmitter WWH-26 162.425 MHz

Available 24 Hours a Day!



This quarterly newsletter is for Skywarn Spotters, schools, emergency managers, media, and other interested parties in the 15 county area in east-central North Carolina served by the National Weather Service Office in Newport, NC.

This publication, as well as all of our forecast products, are also available on our internet page at: www.erh.noaa.gov/mhx/